FIG. 1

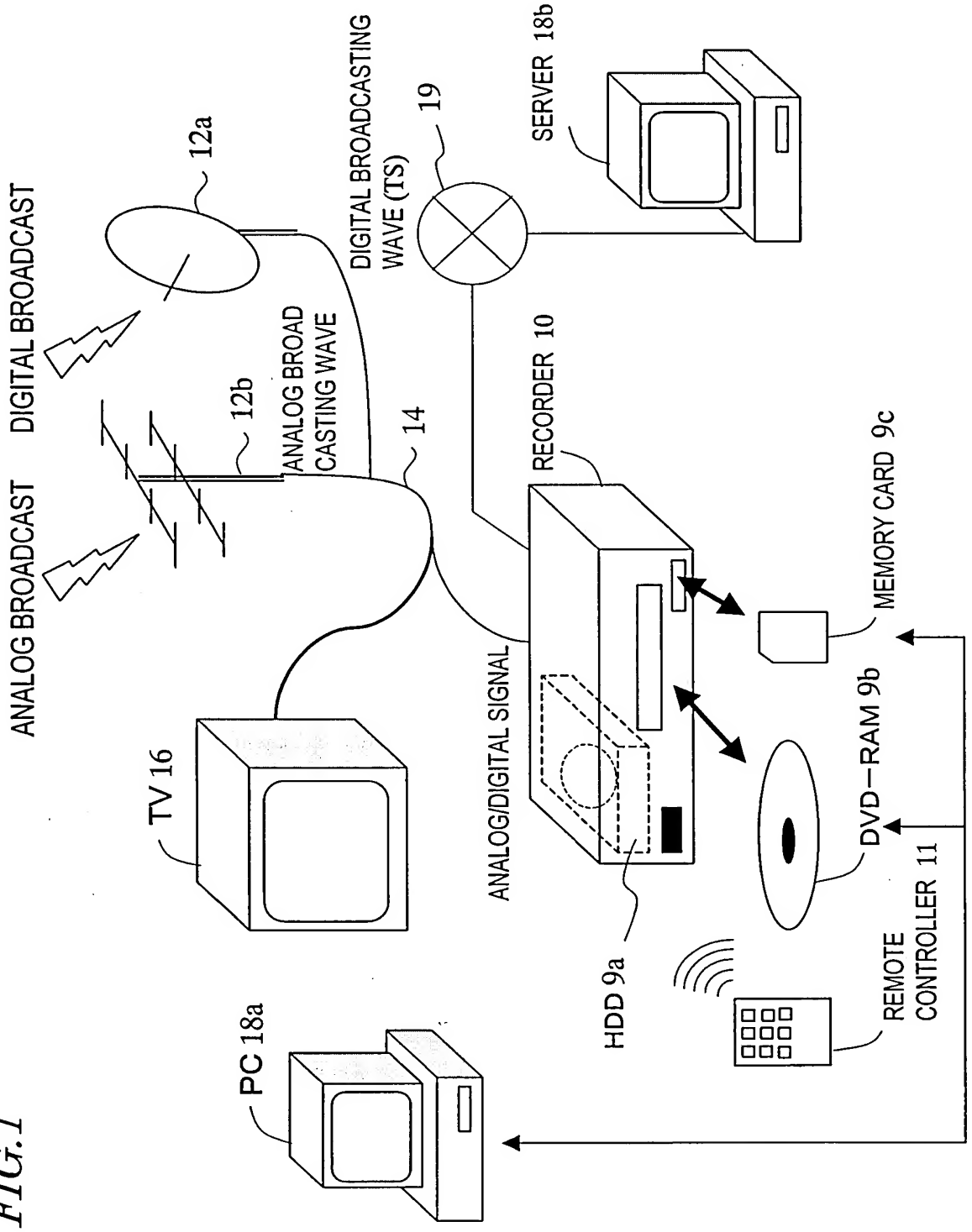

ANALOG BROADCAST
DIGITAL BROADCAST
12a
12b
ANALOG BROAD CASTING WAVE
DIGITAL BROADCASTING WAVE (TS)
19
SERVER 18b
14
RECORDER 10
TV 16
ANALOG/DIGITAL SIGNAL
MEMORY CARD 9c
DVD−RAM 9b
PC 18a
HDD 9a
REMOTE CONTROLLER 11

FIG.2

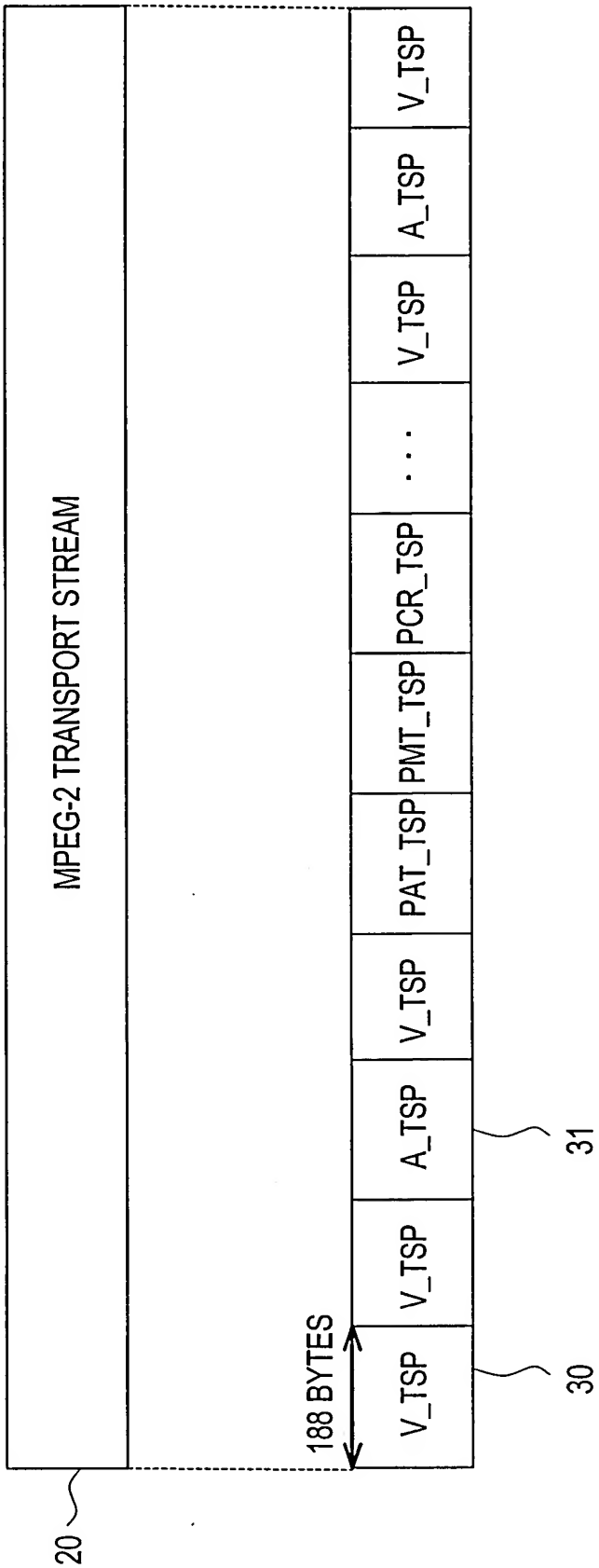

MPEG-2 TRANSPORT STREAM
20
188 BYTES
V_TSP
V_TSP
A_TSP
V_TSP
PAT_TSP
PMT_TSP
PCR_TSP
. . .
V_TSP
A_TSP
V_TSP
30
31

FIG.3

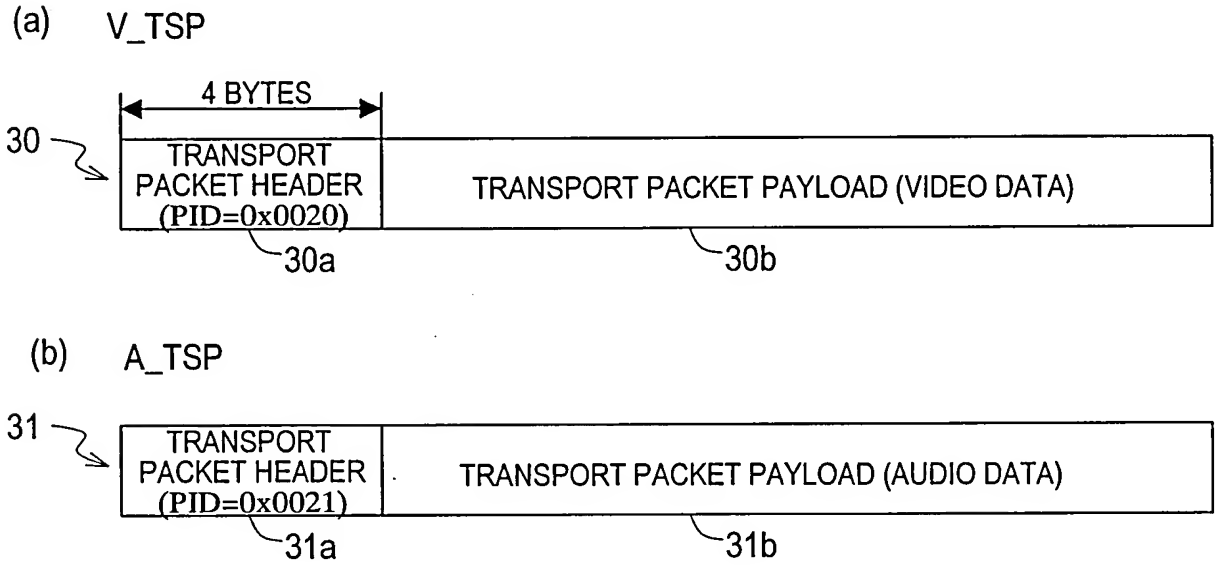

(a) V_TSP
4 BYTES
30
TRANSPORT PACKET HEADER (PID=0x0020)
TRANSPORT PACKET PAYLOAD (VIDEO DATA)
30a
30b
(b) A_TSP
31
TRANSPORT PACKET HEADER (PID=0x0021)
TRANSPORT PACKET PAYLOAD (AUDIO DATA)
31a
31b

FIG. 4

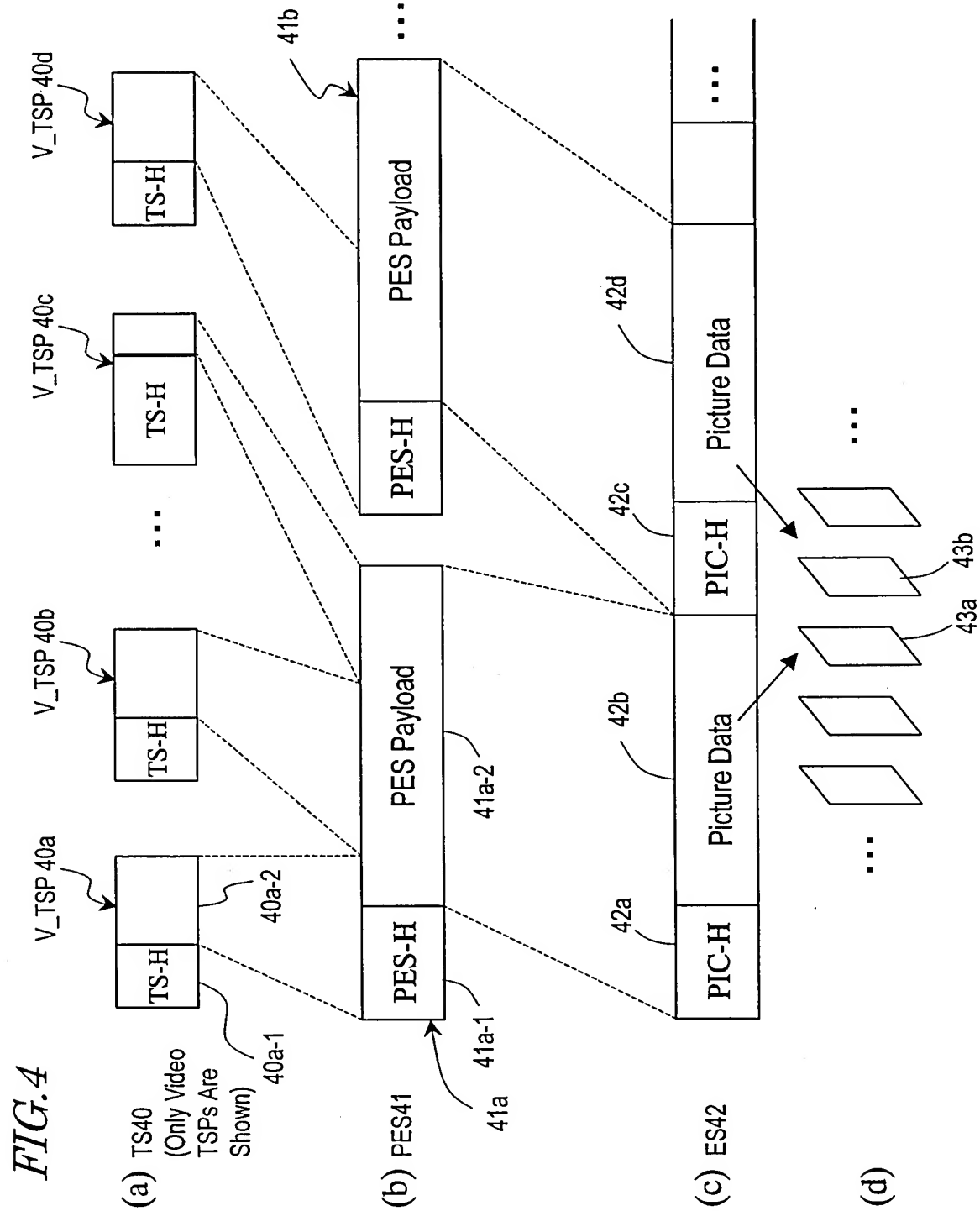

(a) TS40 (Only Video TSPs Are Shown)
V_TSP 40a
V_TSP 40b
V_TSP 40c
V_TSP 40d
TS-H
40a-1
40a-2
(b) PES41
PES-H
PES Payload
41a
41a-1
41a-2
41b
(c) ES42
PIC-H
Picture Data
42a
42b
42c
42d
(d)
43a
43b

FIG.5

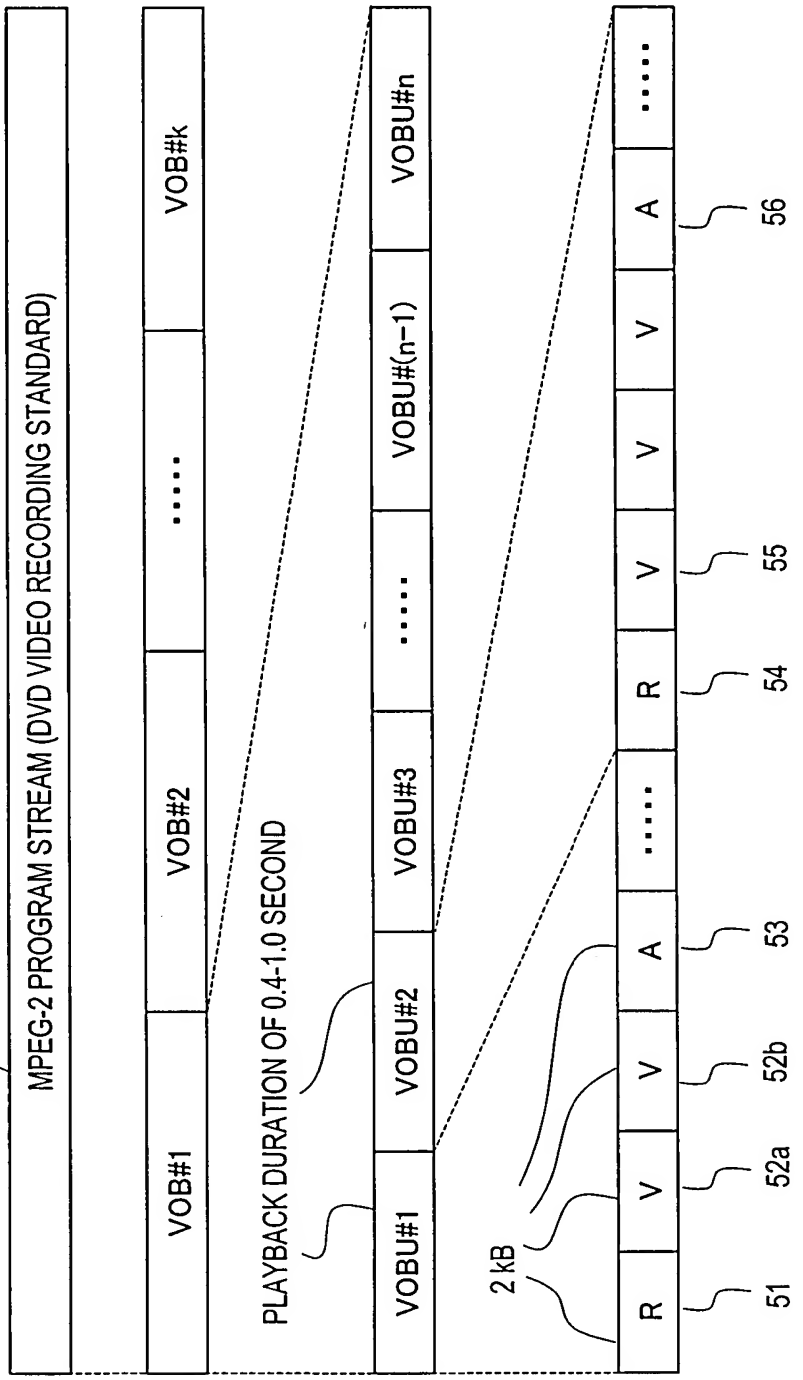

50
MPEG-2 PROGRAM STREAM (DVD VIDEO RECORDING STANDARD)
VOB#1
VOB#2
.....
VOB#k
PLAYBACK DURATION OF 0.4-1.0 SECOND
VOBU#1
VOBU#2
VOBU#3
.....
VOBU#(n-1)
VOBU#n
2 kB
R
V
V
A
.....
R
V
V
V
A
.....
51
52a
52b
53
54
55
56

FIG.6

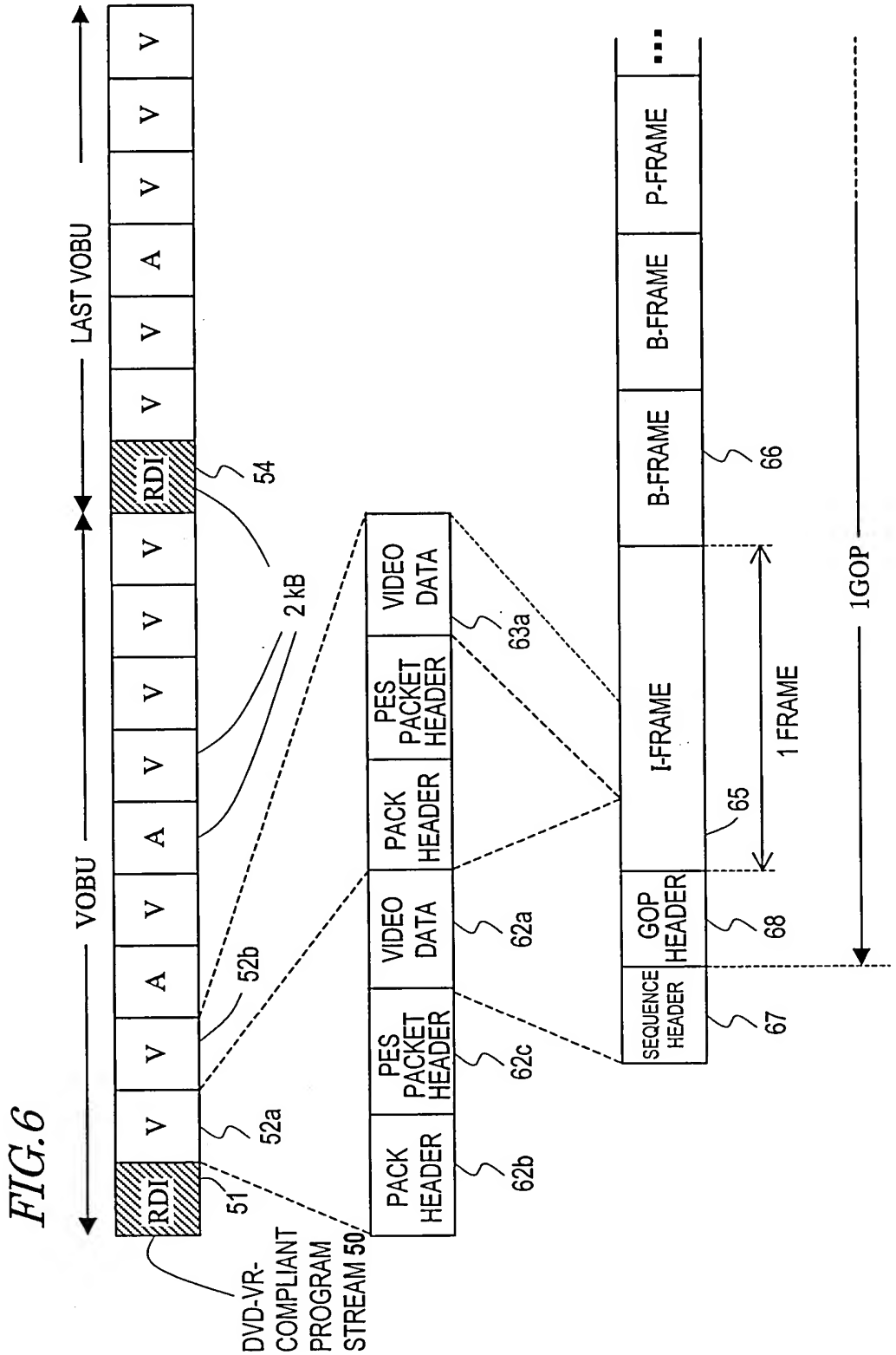

VOBU
LAST VOBU
RDI
V
A
2 kB
54
52b
52a
51
DVD-VR-COMPLIANT PROGRAM STREAM 50
PACK HEADER
PES PACKET HEADER
VIDEO DATA
62b
62c
62a
63a
SEQUENCE HEADER
GOP HEADER
I-FRAME
B-FRAME
P-FRAME
65
66
67
68
1 FRAME
1GOP

FIG. 7

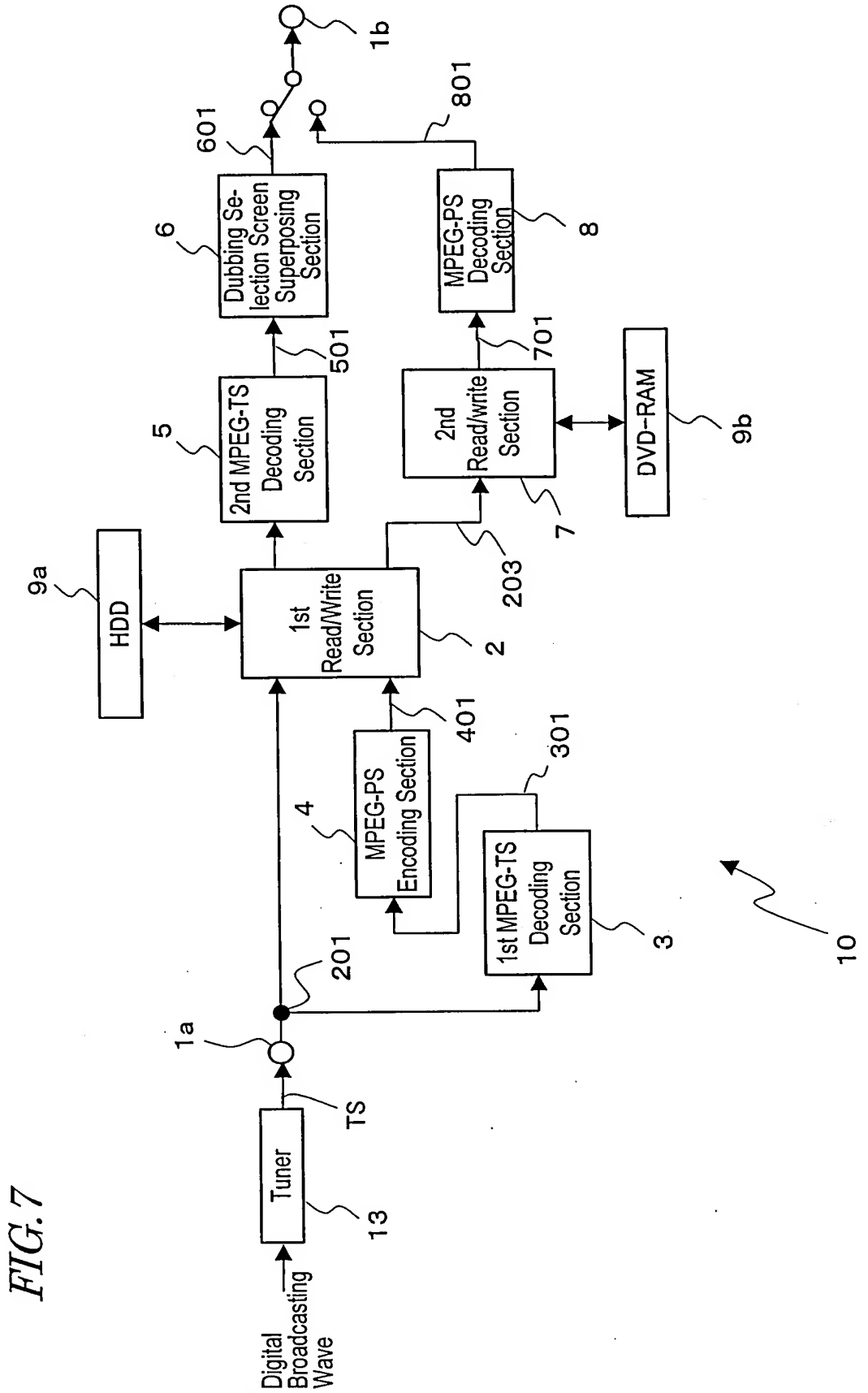

Digital Broadcasting Wave
Tuner
13
TS
1a
201
1st MPEG-TS Decoding Section
3
301
MPEG-PS Encoding Section
4
401
1st Read/Write Section
2
203
HDD
9a
2nd MPEG-TS Decoding Section
5
501
Dubbing Selection Screen Superposing Section
6
601
1b
2nd Read/write Section
7
701
DVD-RAM
9b
MPEG-PS Decoding Section
8
801
10

FIG. 8

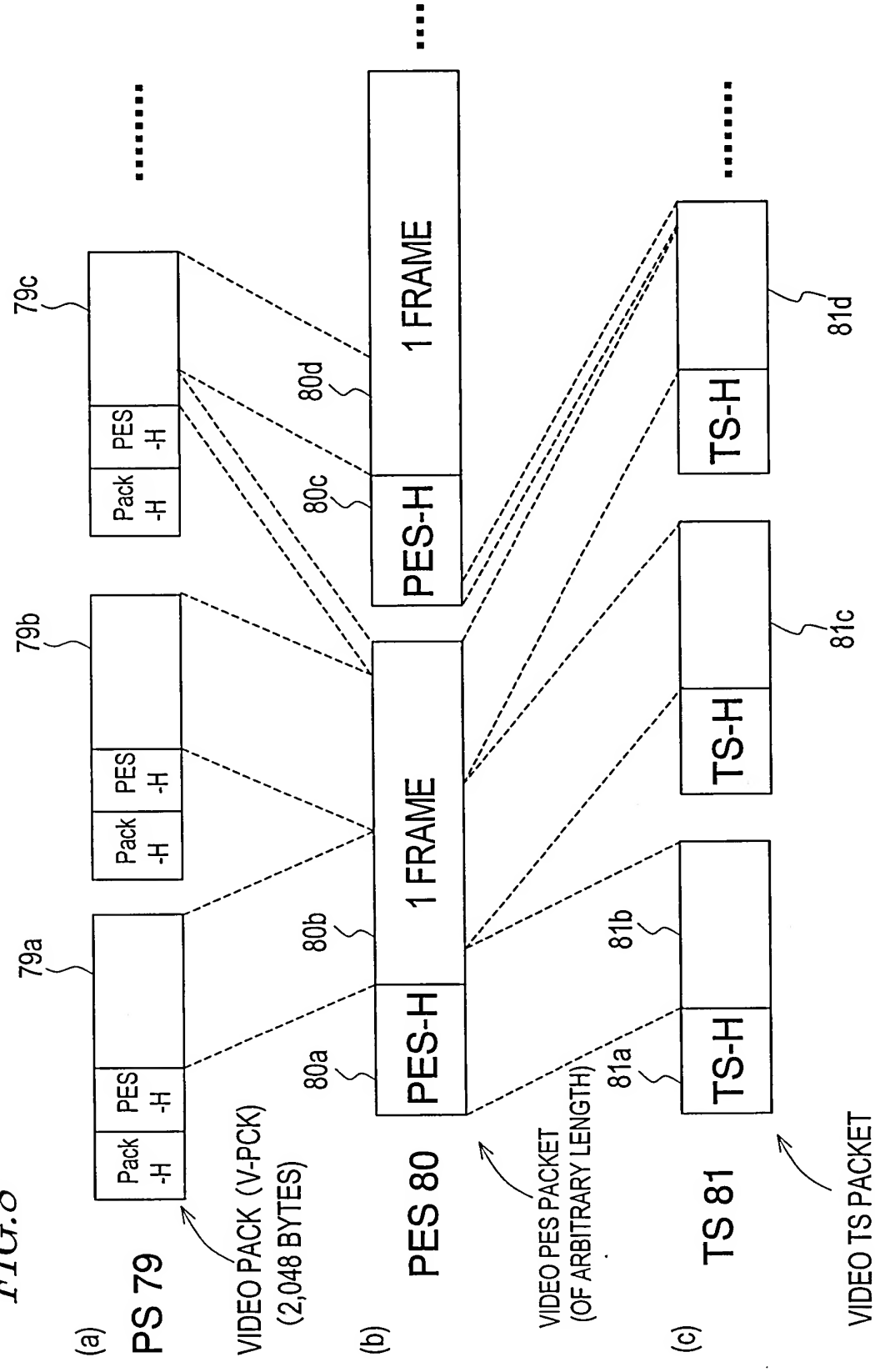

(a)
PS 79
Pack -H
PES -H
79a
79b
79c
VIDEO PACK (V-PCK)
(2,048 BYTES)
(b)
PES 80
PES-H
1 FRAME
80a
80b
80c
80d
VIDEO PES PACKET
(OF ARBITRARY LENGTH)
(c)
TS 81
TS-H
81a
81b
81c
81d
VIDEO TS PACKET
(V_TSP)
(188 BYTES)

FIG.9

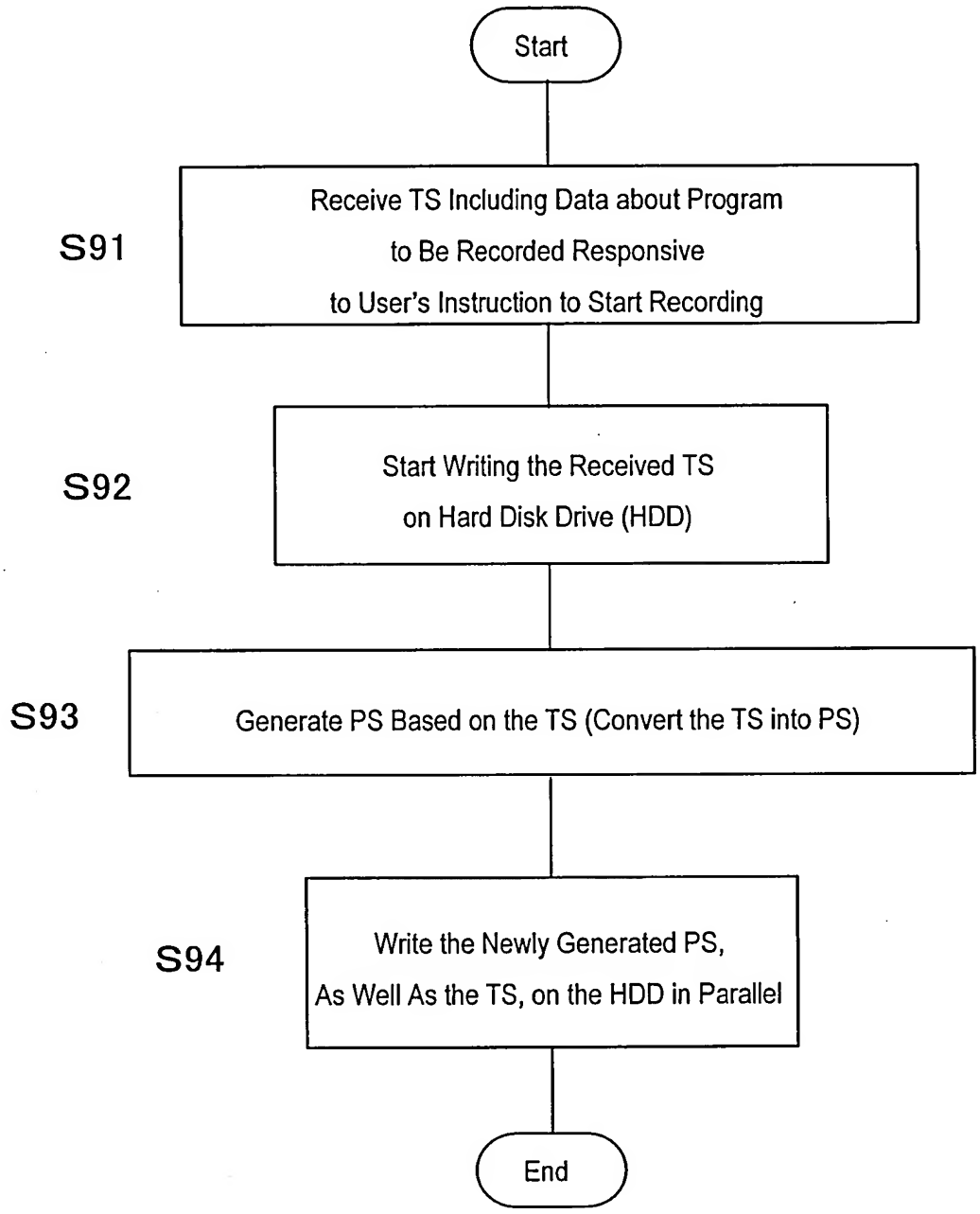

Start
S91
Receive TS Including Data about Program
to Be Recorded Responsive
to User's Instruction to Start Recording
S92
Start Writing the Received TS
on Hard Disk Drive (HDD)
S93
Generate PS Based on the TS (Convert the TS into PS)
S94
Write the Newly Generated PS,
As Well As the TS, on the HDD in Parallel
End

FIG.10

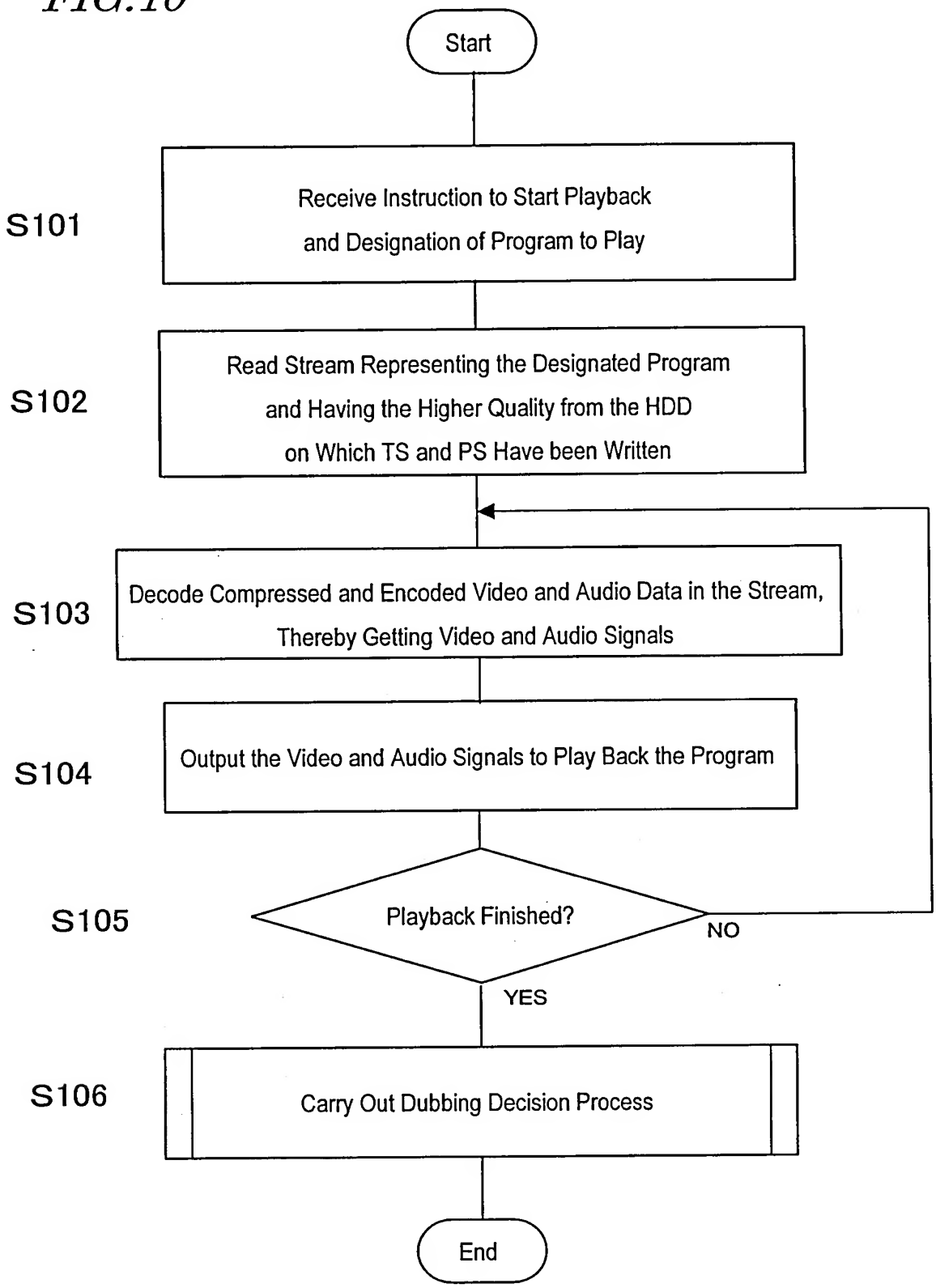
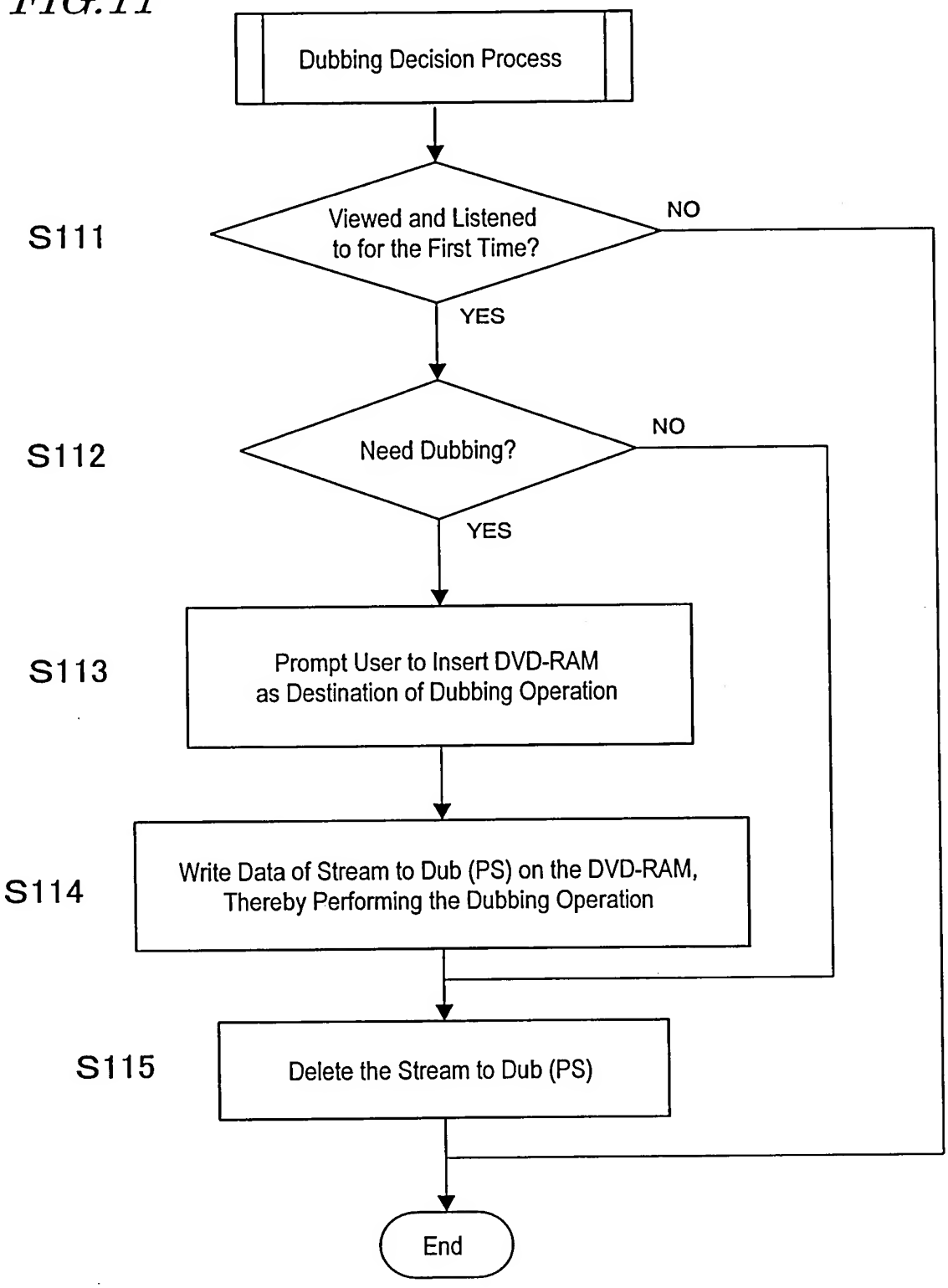

Start
S101
Receive Instruction to Start Playback and Designation of Program to Play
S102
Read Stream Representing the Designated Program and Having the Higher Quality from the HDD on Which TS and PS Have been Written
S103
Decode Compressed and Encoded Video and Audio Data in the Stream, Thereby Getting Video and Audio Signals
S104
Output the Video and Audio Signals to Play Back the Program
S105
Playback Finished?
NO
YES
S106
Carry Out Dubbing Decision Process
End

FIG. 11


Dubbing Decision Process
S111
Viewed and Listened to for the First Time?
NO
YES
S112
Need Dubbing?
NO
YES
S113
Prompt User to Insert DVD-RAM as Destination of Dubbing Operation
S114
Write Data of Stream to Dub (PS) on the DVD-RAM, Thereby Performing the Dubbing Operation
S115
Delete the Stream to Dub (PS)
End

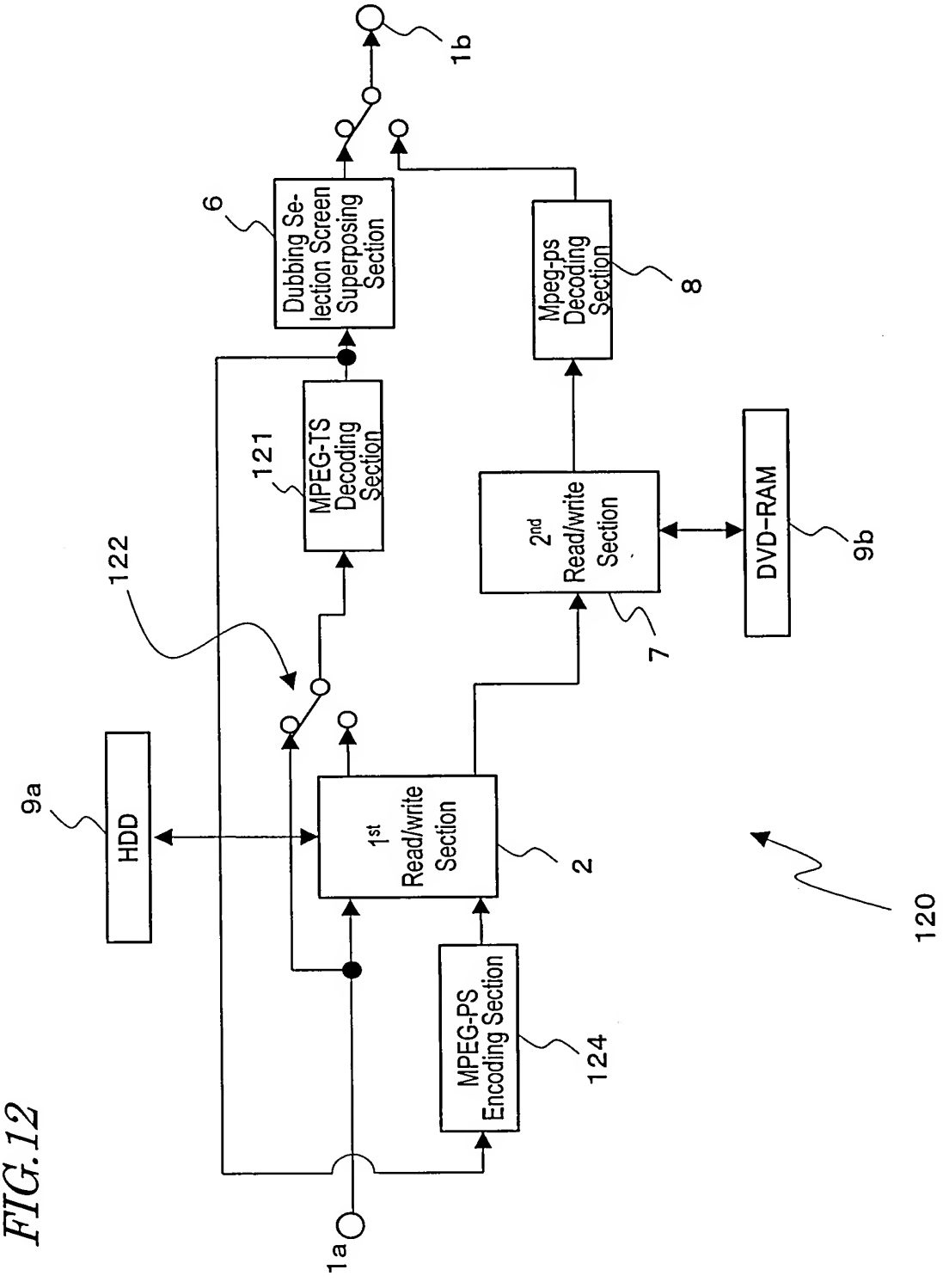

1a
1b
9a
HDD
1st Read/write Section
2
MPEG-PS Encoding Section
124
122
121
MPEG-TS Decoding Section
6
Dubbing Selection Screen Superposing Section
2nd Read/write Section
7
Mpeg-ps Decoding Section
8
DVD-RAM
9b
120

FIG. 12

FIG.13

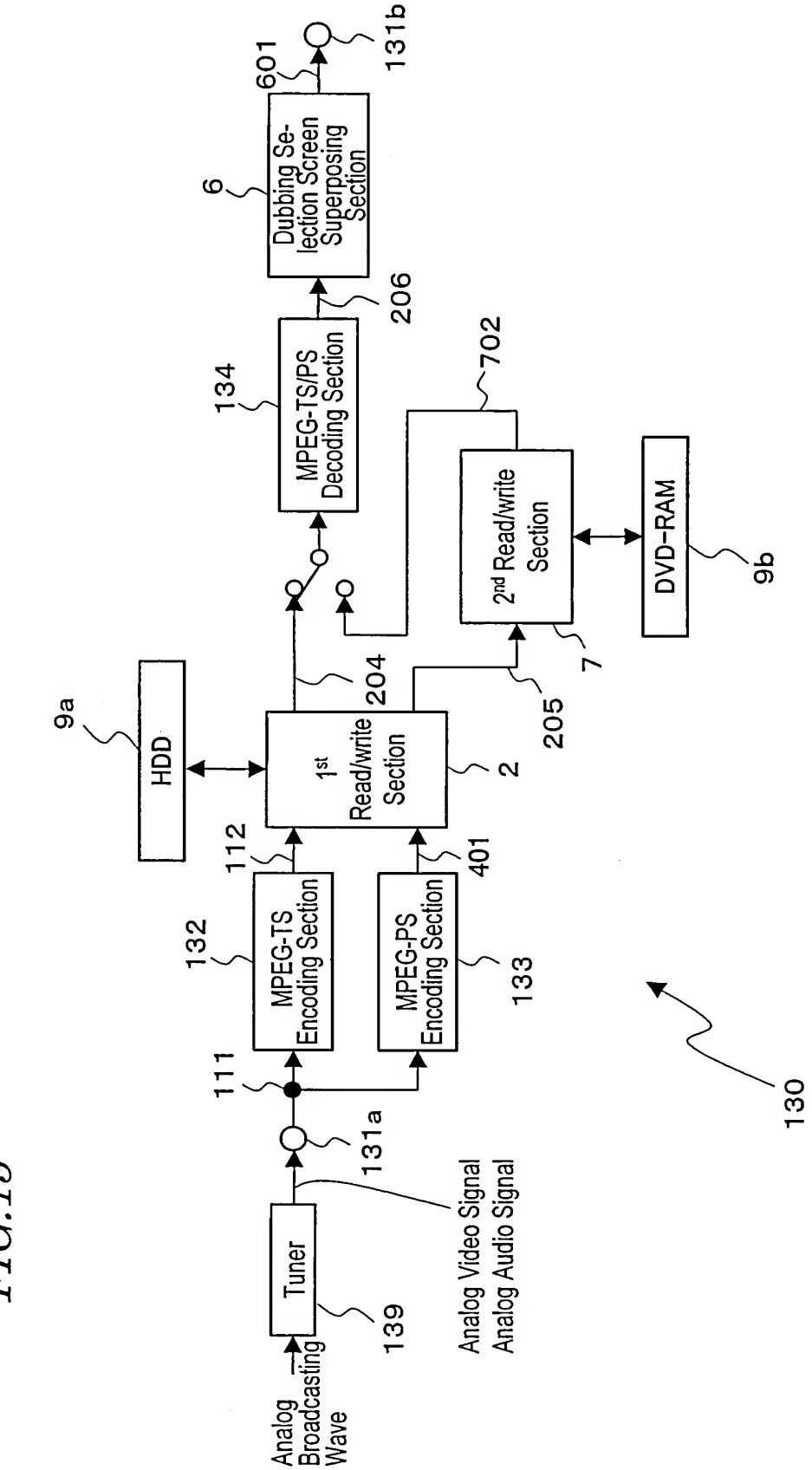
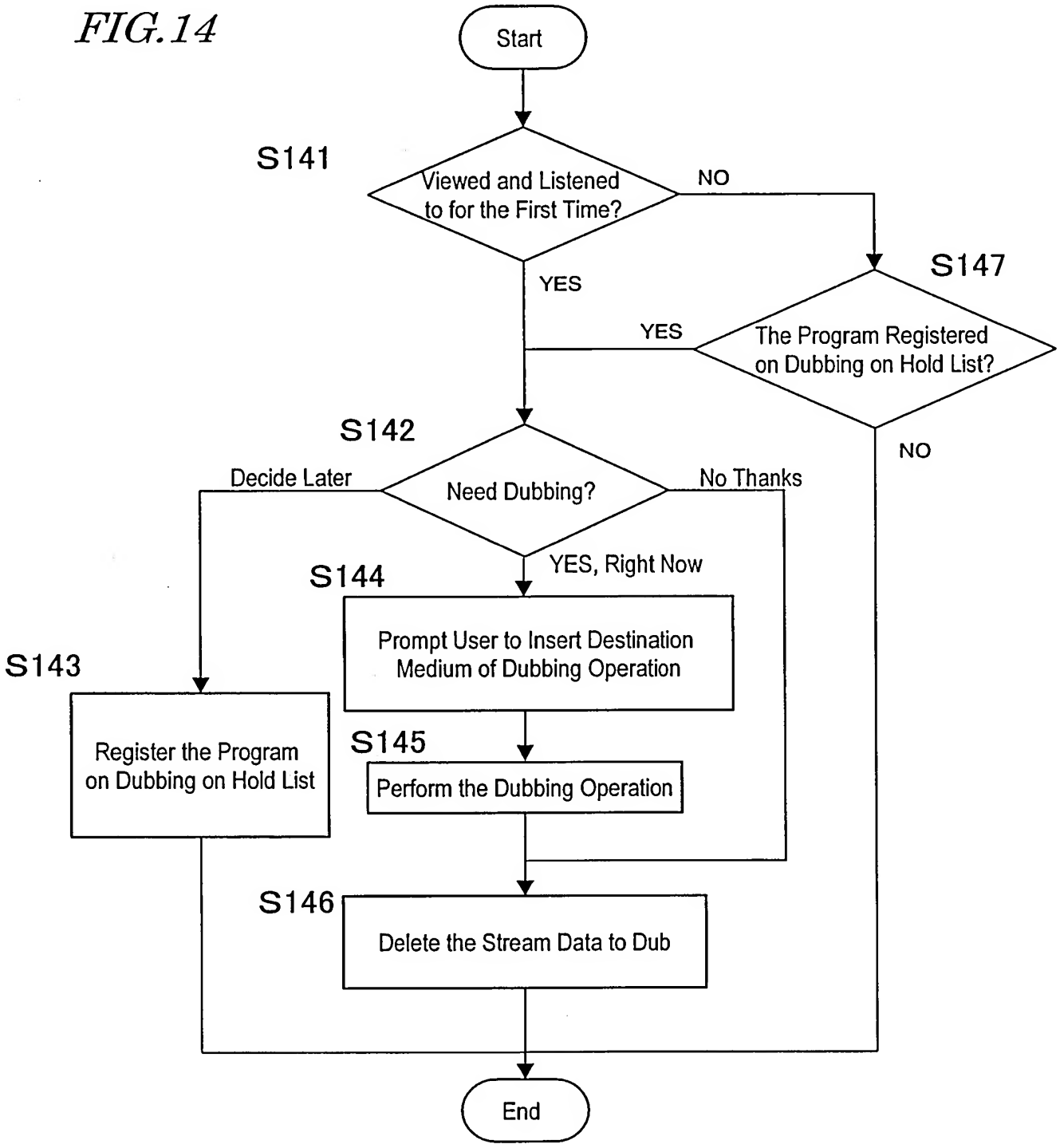

Analog Broadcasting Wave
Tuner
139
131a
Analog Video Signal
Analog Audio Signal
111
MPEG-TS Encoding Section
132
MPEG-PS Encoding Section
133
112
401
HDD
9a
1st Read/write Section
2
204
205
2nd Read/write Section
7
DVD-RAM
9b
702
MPEG-TS/PS Decoding Section
134
206
6
Dubbing Selection Screen Superposing Section
601
131b
130

FIG.14


Start
S141
Viewed and Listened to for the First Time?
NO
YES
S147
YES
The Program Registered on Dubbing on Hold List?
NO
S142
Decide Later
Need Dubbing?
No Thanks
YES, Right Now
S144
Prompt User to Insert Destination Medium of Dubbing Operation
S143
Register the Program on Dubbing on Hold List
S145
Perform the Dubbing Operation
S146
Delete the Stream Data to Dub
End

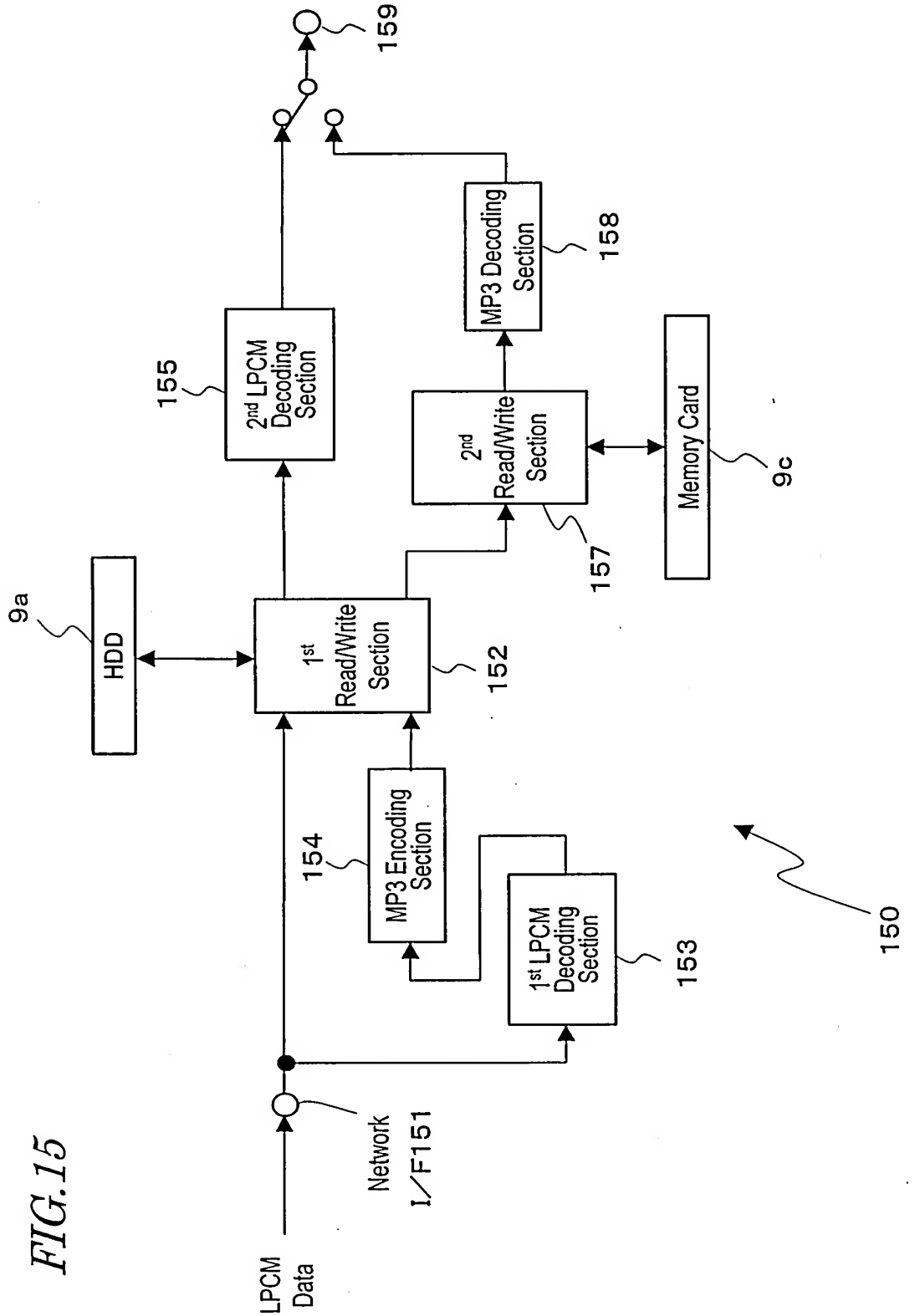

LPCM Data
Network I/F 151
1st LPCM Decoding Section
153
MP3 Encoding Section
154
1st Read/Write Section
152
HDD
9a
2nd LPCM Decoding Section
155
159
MP3 Decoding Section
158
2nd Read/Write Section
157
Memory Card
9c
150

FIG.15

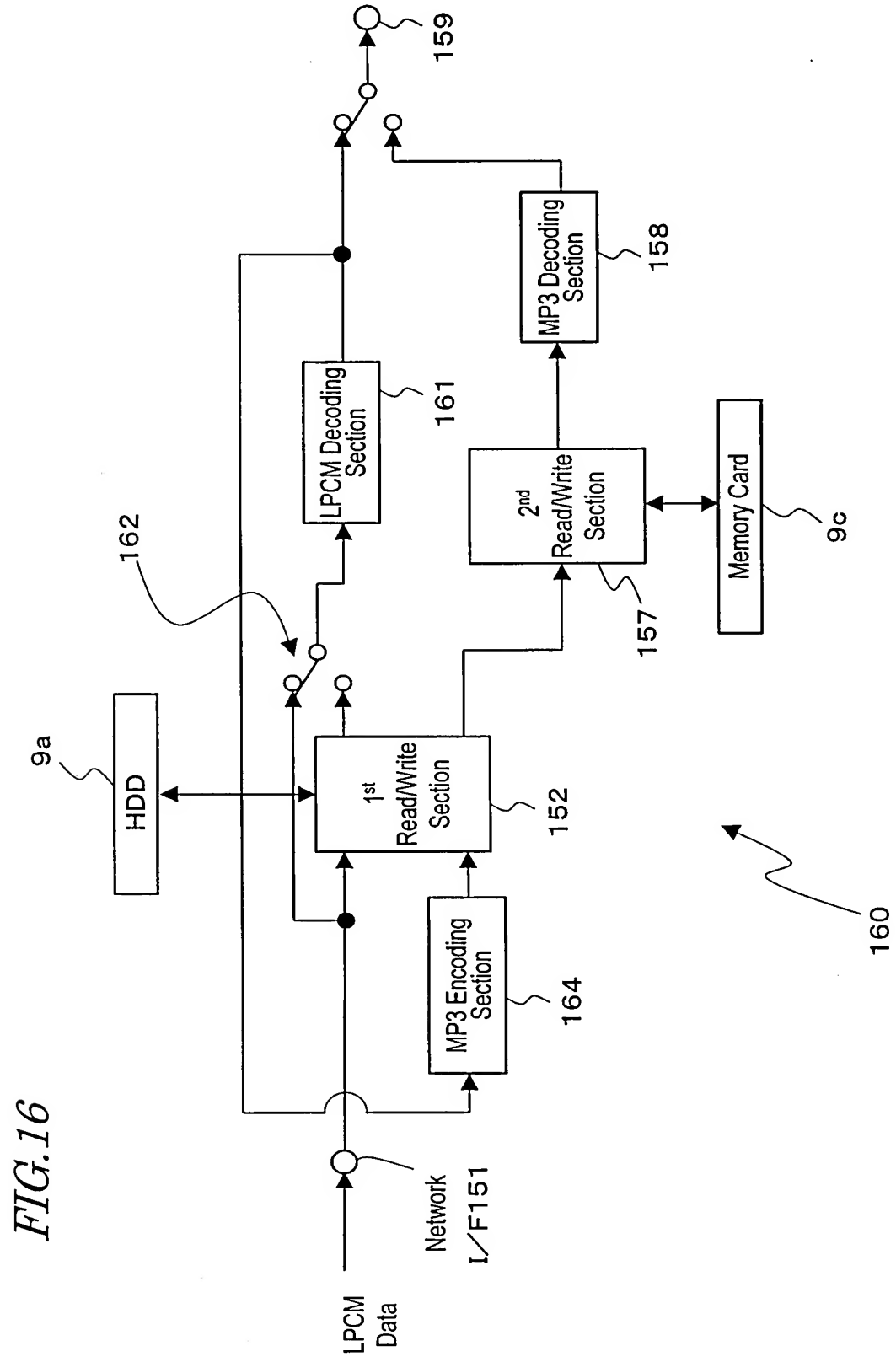

LPCM Data
Network I/F151
MP3 Encoding Section
164
1st Read/Write Section
152
HDD
9a
162
LPCM Decoding Section
161
2nd Read/Write Section
157
MP3 Decoding Section
158
Memory Card
9c
159
160

FIG.16